Arctic Thunder at 60° Below

by Captain Patrick J. Sweeney

Exercise Brimfrost 89 proved the Arctic Redlegs of the 6th Infantry Division (Light) in Alaska can perform their mission and survive in temperatures of 60 degrees below zero and lower. This article focuses on the weather-induced problems the Arctic Thunder Redlegs experienced and the actions taken to overcome these obstacles.

Brimfrost is a biannual, joint readiness exercise conducted by Forces Command (FORSCOM). The purpose of this exercise is to train joint forces in arctic warfare, including the Army, Air Force, Navy, Marines, Coast Guard, National Guard and Canadian forces.

The culmination of Brimfrost 89 was a three-day, force-on-force exercise held in the Tanana Flats. The Flats, 10 miles south of Fairbanks, is arctic tundra vegetated by scrub bushes as well as sparse groves of birch and spruce trees.

Brimfrost 89 occurred during one of Alaska's record cold spells. Temperatures during the two-week exercise averaged 50 degrees below zero F, and exceedingly thick ice fog reduced visibility to one-quarter of a mile.

The extreme temperatures during Brimfrost were about the same as those the Germans and Soviets experienced on the Russian front in the terrible winter of 1941-42. During this harsh winter, the German's inadequate cold-weather training and improper clothing cost them more than a quarter of a million casualties from frostbite.

Harsh weather is an enemy we must plan for and counter—as surely as any other enemy force. Failure to properly train and prepare our soldiers will result in injury and death on a scale equal to the losses from the most intense fighting.

Obstacle 1: Soldier Fear

Fear of the unknown and the human survival instinct were the first major obstacles we had to overcome. Soldiers were apprehensive about deploying during Brimfrost because most of them had never experienced such severe conditions.

With no experience, the human mind tends to exaggerate the difficult possibilities as it tries to comprehend the unknown. The soldiers' distorted views of operations in a -60 degree environment and doubts of their abilities to survive created great stress.

To alleviate this stress, we conducted cold-weather indoctrination (CWI) refresher training two days before deployment. Also, the chain of command repeatedly reassured the soldiers that their safety was top priority.

Obstacle 2: NCO Leadership

The NCOs are critical to our successfully accomplishing missions in cold-weather operations. They must thoroughly train their soldiers in the basic skills required to function and survive in a cold climate. Furthermore, during cold-weather operations, the NCOs must constantly check to ensure their soldiers are following basic survival skills (eating, hydration and hygiene), wearing their clothing properly and getting warmed-up on a regular basis. Well-trained soldiers and concerned NCOs will limit cold weather casualties, which will give the unit the personnel necessary to accomplish the mission.

Obstacle 3: Leader Stress

Operating in extremely cold weather places an excessive stress on leaders, causing them to fatigue more quickly. This stress is induced by being responsible for the survival of subordinates, mission accomplishment and their own survival. Also, every decision a leader makes under these harsh conditions puts his soldiers' lives in jeopardy.

Thus, to operate at maximum proficiency, the leaders require a greater amount of rest. They should be aware of this strain, so they can be prepared to use their individual stress-coping mechanisms.

Obstacle 4: Decreased Efficiency

Leaders also must be aware that soldiers will operate at about 50 to 60

percent efficiency in temperatures of 50 degrees below. This is a critical consideration in planning. The simplest task could take up to five times longer to perform in the extreme cold.

Obstacle 5: Modified SOPs

Several modifications to standing operating procedures (SOPs) were necessary to prevent injury and ensure survival. A M1008 civilian utility cargo vehicle (CUCV), with a fuel heater for personnel in the rear cab, accompanied the advance party and main body on all movements to provide a heat source in case a vehicle broke down.

The M973 small unit support vehicle (SUSV) has a coolant heater that's minimally effective at -25 degrees or below. Further, the SUSV's heaters will provide heat only when the vehicle is moving or the engine is idling at 1,200 rpms. So if a SUSV engine quits on a movement, the crew would be at risk for cold-weather injuries in 15 to 30 minutes. The M1008 prevented cold weather injuries on several occasions when SUSVs broke down on the trail.

The advance party's priorities were to ensure security and set up warming tents and the position area. The M1008 provided a heat source for the soldiers while the warming tents were set up. Units must plan for the extra time required to erect the tents to give the advance party time to be prepared to receive the main body.

Obstacle 6: Fuel Resupply

Planning and executing logistical resupply become critical to accomplishing the mission and surviving. Operating in the extreme cold will greatly increase the use of mogas and diesel. Each Yukon stove burned an average of about 17.5 gallons of mogas every 24 hours. Idling the SUSVs greatly increases the use of diesel. The units' increased use of fuel stretched the battalion's petroleum, oil and lubricants (POL) resupply capability to its limits.

This problem was compounded by the fact that the battalion's POL trucks didn't have the cross-country mobility to reach some of the battery positions. We used a five-gallon can shuttle system to meet the battery's fuel demands. Every vehicle that left the battery returning to the battalion trains shuttled empty fuel cans back to get topped off. Also, empty fuel cans were brought to the logistical resupply point (LRP) and filled when Class I was delivered.

Redlegs of the 6th Infantry Div Arty operate a G/VLLD in sub-zero temperatures.

Obstacle 7: Maintenance and Equipment

The following is a list of maintenance problems and equipment limitations caused by the extreme cold.

Ice Crystals In Diesel

Discussion. Condensation formed in the fuel tanks, pumps and lines because of the great temperature difference (100 degrees) between the indoor motor pool and the outside. After three hours of operation, the ice crystals built up around the injectors, cutting off the fuel supply and causing the engines to stop.

Solution. Add ethylene glycol monomethyl ether (icing inhibitor, NSN: 6850-00-753-5061) to the diesel to prevent the crystals from forming. Add the inhibitor one pint per 40 gallons of fuel.

Hoses, Cables and Belts Break

Discussion. At -60 degrees F, rubber loses its elasticity and becomes very brittle. Brittle rubber cracks or breaks when the slightest amount of pressure is applied.

The hydraulic damper line, rear radiator lines and IV cables (between the SUSV cabs) cracked and broke because of the bending caused by turning the vehicle. Engine belts broke on several vehicles. The rubber insulation on the RC-292 cable cracked when setting up the antenna. The Yukon stove's rubber gasoline line broke at the fuel can adapter when changing fuel cans. Also, the fuel can gasket broke when the adapter was tightened.

Solutions. Purchase locally a hose made of rubber designed to operate in the arctic environment for the SUSV damper hose and buy preformed hose insulation wraps for the IV radiator lines. Also secure the IV cable to the rear cab with nylon (550) cord. This limits the bending of the cable.

Inspect and replace cracked or frayed engine belts before deploying to a cold climate. Also, ensure engine belts on the prescribed load list (PLL) are at 100 percent stockage before deploying.

Keep the RC-292 cable warm until the antenna is ready to be erected and be sure the cable is warmed before bending or folding it.

For the Yukon stove fuel hose and fuel can gasket, have two men change the fuel can. One man handles the fuel can, and the other keeps the hose from bending by rotating the adapter's swivel.

Another solution is to have two complete fuel systems (burner plate, fuel hose and adapter) and just rotate them. When you have to change the fuel can, bring the warm system out and the brittle hose in to warm up.

Finally, you can replace the standard rubber hose with an arctic hose (NSN: 4220-00-542-3304) designed to remain flexible down to -50 degrees F. Also, an arctic fuel can gasket (NSN: 7240-00-132-6431) is available through the Army's supply channels.

Vehicle Batteries Stop

Discussion. At -40 degrees, current output is zero on a vehicle battery. Therefore to start a vehicle, you must use a heating source, either swingfire or Herman Nelson, to heat the batteries. It takes about 15 to 30 minutes to heat a battery to start the vehicle. In a field environment, this is impractical, taking too much time and equipment.

Solution. Idle vehicles in neutral at 1,200 rpms for two-hour periods. At the end of the two hours, turn them off for 15 minutes to perform preventive maintenance checks and services (PMCS).

Elevating and Traversing Mechanisms Inoperable

Discussion. During Brimfrost, temperatures approached and exceeded the lower limit (-65 degrees F) of the operating range of the grease (GAA) used to lubricate the elevating and traversing mechanisms. The howitzers were very hard to operate or stopped elevating or traversing because of the increased viscosity of the GAA.

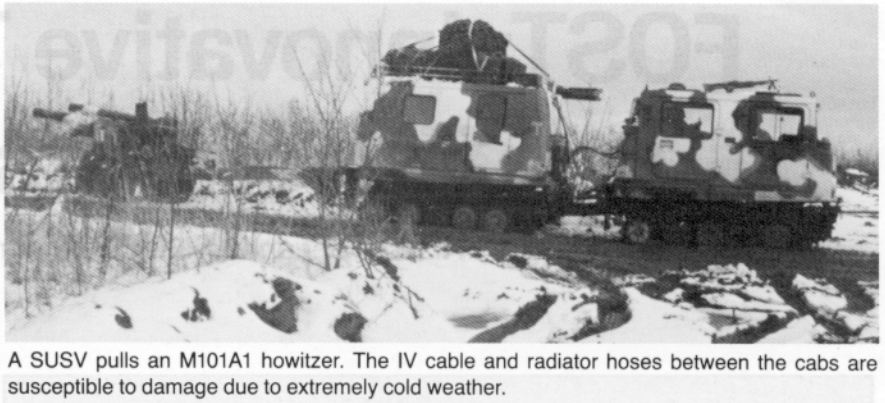
Solution. Remove all snow and frost from arcs and pinions with a stiff brush before trying to elevate or traverse the howitzer. If they're frozen, use a heating source to gradually heat the elevating and traversing mechanism gear housing until movement is possible. Continue to elevate and traverse the tube until you get the full range of motion. In extremely cold weather, you must exercise the elevating and traversing mechanisms at regular intervals to prevent their freezing.

Breech Blocks Freeze Shut

Discussion. The severe temperature froze several breech blocks shut and made the others difficult to operate.

Solutions. Use a blow torch or heating device to thaw the breech block. After thawing, completely disassemble and clean all parts and apply a light coat of lubricating oil, weapons (LAW NSN: 9150-00-292-9689).

To prevent a breech block from becoming inoperable because of the cold, clean it and apply a light coat of LAW before deploying. Furthermore, you must exercise the breech at regular intervals when not in use to keep it operating smoothly. Cover the breech to prevent frost buildup when not in use or while traveling. Frost will break down the lubricating properties of your lubricant oil.



A SUSV pulls an M101A1 howitzer. The IV cable and radiator hoses between the cabs are susceptible to damage due to extremely cold weather.

Radios Freeze

Discussion. The coolant heater in the front cab of the SUSV could not produce enough heat to keep the VRC-46 radios from freezing when the temperature dropped below -25 degrees F.

Solution. Rotate the radios every two hours from the vehicle to the warm-up tent.

Push-to-Talk Switches Freeze

Discussion. After 30 minutes exposure to the extreme cold, several advance party soldiers' TA-312 push-to-talk switches froze, making the TA-312s unserviceable.

Solution. Have the advance party soldier put his TA 312 inside his parka after receiving his initial data. Then, re-hook the TA-312 after emplacing the howitzer.

Lost Current in Dry-Cell Batteries

Discussion. At -40 degrees F and below, all dry-cell batteries will freeze and lose all current in a matter of minutes.

Solution. Keep your batteries warm by placing them inside a parka until you need them. If you must keep equipment outside, rotate the batteries every 15 minutes.

Overview

We encountered and overcame all these maintenance and equipment problems on Brimfrost 89. Units deploying or operating in a cold-weather climate will find *FM 9-207 Operation and Maintenance of Ordnance Material in Cold Weather (0 to -65 F)* an invaluable reference. This excellent manual outlines how to prepare and operate equipment in extremely cold weather. Every unit library should have a copy.

Conclusion

Brimfrost 89 was successful, though it tested the limits of the Arctic Redlegs and our equipment. We learned many new lessons and re-learned some old ones. One lesson we learned is well-trained and well-led soldiers are more dependable and resilient in extreme temperatures than their equipment.

The knowledge and experience gained by our operating in temperatures below -60 degrees F enables the Arctic Artillerymen of the 6th Infantry Division to perform their mission better in the future. We are ***Arctic Thunder.***

Captain Patrick J. Sweeney is the Fire Support Officer for the 4th Battalion, 9th Infantry, at Fort Wainwright, Alaska. Until recently, he commanded A Battery, 5th Battalion, 11th Field Artillery, Fort Wainwright, a new COHORT battery he had commanded since before its official activation in June 1988. Captain Sweeney has served as the Battalion Motor Officer, a battery executive officer and fire direction officer and company fire support officer for 1st Battalion, 10th Field Artillery, Schweinfurt, West Germany. He's a graduate of the Combined-Arms and Services Staff School, Fort Leavenworth, Kansas; Ranger and Airborne Schools, both at Fort Benning, Georgia; the Field Artillery Officer Advanced Course, Fort Sill, Oklahoma; and the US Military Academy at West Point.